

**(12) PATENT**  
**(19) AUSTRALIAN PATENT OFFICE**

**(11) Application No. AU 199460782 B2**  
**(10) Patent No. 686135**

(54) Title  
Building block

(51)<sup>6</sup> International Patent Classification(s)  
E04C 1/00 20060101AFI20  
(2006.01) 060408BMEP  
E21F 15/04 E21F 15/04  
(2006.01) 20060101ALI20  
E04C 1/00 060408BMEP

(21) Application No: 199460782

(22) Application Date: 1994 . 04 . 28

(30) Priority Data

(31) Number	(32) Date	(33) Country
PL8561	1993 . 04 . 29	AU

(43) Publication Date : 1994 . 11 . 03

(43) Publication Journal Date : 1994 . 11 . 03

(44) Accepted Journal Date : 1998 . 02 . 05

(71) Applicant(s)  
Tecrete Industries Pty Ltd

(72) Inventor(s)  
Brian Moore

(74) Agent/Attorney  
Griffith Hack,GPO Box 4164,SYDNEY NSW 2001

(56) Related Art  
AU 53350/90  
FR 2303121  
FR 2601399

# BUILDING BLOCK

## ABSTRACT

A building block (10) comprises a pair of walls (11, 12) formed as a grid of steel wire or alternatively moulded in plastics material. Walls (11, 12) are interconnected by base (16). The block walls comprise a number of horizontally extending bar members (14) and vertically extending bar members (13). Sandwiched between the bar members (13, 14) is a steel mesh sheet (18) or plastics sheet. The sheet (18) or plastics sheet is adapted to allow a builder to see inside and through the structure while filling the same with an infill material such as cement grout, concrete, flyash cement grout or the like.

Fig. 1

RLF/04041

AUSTRALIA

PATENTS ACT 1990

COMPLETE SPECIFICATION

FOR A STANDARD PATENT

ORIGINAL

Name and Address  
of Applicant: Tecrete Industries Pty Ltd  
11 George Road  
Salamander Bay New South Wales 2301  
AUSTRALIA

Actual Inventor(s): Brian Moore  
ADDRESS FOR SERVICE  
ALTERED  
Griffith Hack, 168 Walker St, North Sydney  
Address for Service: ~~Spruson & Ferguson, Patent Attorneys N.S.W 2060~~  
~~Level 33 St Martins Tower, 31 Market Street~~  
~~Sydney, New South Wales, 2000, Australia~~

Invention Title: Building Block

**ASSOCIATED PROVISIONAL APPLICATION DETAILS**

[31] Application No(s)	[33] Country	[32] Application Date
PL8561	Au	29 April 1993

The following statement is a full description of this invention,  
including the best method of performing it known to me/us:-

5815/3

**BUILDING BLOCK**Field of the Invention

The following invention relates to a building block, particularly suitable for the construction of walls in underground mining situations.

5 It is known to produce cavity blocks from concrete, polystyrene and other materials. Such cavity blocks once erected into a wall configuration are then filled with concrete or grout to produce a relatively solid structure suitable for downward loading.

Although such a method of construction provides a wall displaying a desired downward loading capacity, face loading or horizontal loading strength is not  
10 specifically addressed. More particularly, in blocks formed from a material weaker in strength than the concrete or grout used to fill the cavities therein, a substantial area of relatively low face loading strength remains.

A further problem of known cavity blocks is that the block material is opaque, thus not providing a visual means of ensuring that the cavity is filled with grout or  
15 concrete.

A further problem in such cavity blocks is that the cavities extend between upper and lower faces only. Accordingly there is no provision for the insertion of horizontal steel reinforcing bars extending through and between adjoining blocks.

Object of the Invention

20 It is the object of the present invention to overcome or substantially ameliorate at least one of the above disadvantages, and/or more generally to provide an improved building block.

Disclosure of the Invention

There is disclosed herein a building block comprising:

25 a base of mesh or sheet material, a pair of laterally spaced sides of mesh or sheet material, and open ends, the base and sides being adapted to aid in retaining infill material within the block, and

an elongate cross brace connected to each side and extending laterally therebetween and being adapted to restrain the sides against outward movement as a  
30 result of load thereon from any infill material within the block.

Preferably, the building block further includes an open top.

Preferably, the building block further comprises a frame comprising a grid of wire to at least a part of which said base and sides are attached.

35 Preferably, the building block further comprises a frame comprising a grid of wire with at least a part of which said base and sides are integrally formed.

Preferably, the frame is formed of moulded plastics material.

Preferably, the mesh or sheet is steel.

Preferably, the mesh or sheet is a membrane of plastics or other material.

Preferably, each side comprises both vertically and horizontally extending elements.



IN:SUB1101148:KEN

Preferably, the cross brace has clip-engagement means for inter-engagement at each end thereof with said sides.

Preferably, the block is filled with an infill material.

The above disclosed building block may be laid into position with adjoining blocks to provide a hollow structure which may be filled with any infill material such as but not limited to mining industry cement, grout, concrete, flyash cement grout, calcined gypsum or Hardstop, foamed or lightweight concretes such as "Tekseal" or "Mearlcrete", etc. With appropriate selection of the steel or plastics mesh size or where a continuous sheet is used, the unset grout may be prevented from passing through the sides of the block.

As an advantage of the above disclosed building block, almost the entire constructed wall will be formed of grout. Furthermore, as the block would normally have open ends, horizontal steel deformed bars for example may extend through and between neighbouring blocks. That is, a wall displaying the same face loading capacity and/or downward loading capacity produced by conventional techniques may be provided of substantially reduced thickness.

It is envisaged that there would be no areas of weakness for face loading as is the case with prior art blocks.

#### Brief Description of the Drawing

A preferred form of the present invention will now be described by way of example with reference to the accompanying drawings, wherein:

Fig. 1 is a schematic perspective view of a building block, and

Fig. 2 is a schematic elevational view of a cross brace for use with the block of Fig. 1.

#### Description of the Preferred Embodiment

In the accompanying drawing there is schematically depicted a building block 10. Block 10 in its preferred form comprises a pair of walls 11 and 12 formed of a grid pattern of 4.5mm steel wire. Alternative wire sizes may however be used. Walls 11 and 12 are interconnected by way of base 16. Block 10 would typically be folded from a flat grid of wire.

The block walls comprise a number of horizontally extending bar members 14 and vertically extending bar members 13. Sandwiched between the bar members 13 and 14 is a steel mesh sheet 18. The steel mesh sheet



IN:ALIBLJ01148:KEN

is typically of 6 x 6mm mesh size. However, any suitable mesh size may be adopted depending on the viscosity and other characteristics of grout to be filled within the block. Alternatively, rather than a steel mesh, a plastics mesh or even an opaque, transparent or translucent plastics sheet may be used. It would be desirable to choose a material that allows the builder to see inside and through the structure while filling takes place.

As can be seen in Fig. 1, the block 10 comprises a pair of open ends 15 and 17 through which horizontally extending deformed reinforcing bars may pass.

When stacking blocks 1 on top of one another, it should be appreciated that the side walls 11 and 12 are resiliently separable from one another to a certain extent. Such movement would allow the lower horizontal bar members 19 of an upper block to slide past the upper horizontal members of a lower block and rest against the second horizontal members 20 at the inside edge of walls 11 and 12. In order to prevent the opposing walls 11 and 12 from further separating, a cross brace 22 may extend between opposing horizontal or vertical bar members such as 20 in Fig. 2. The brace 22 may be provided with clip engagement means 24 to snap over the respective bar members 20. To further enhance a secure fit, the outwardly extending tips 23 of brace 22 may engage with steel mesh 18. The brace 22 may be formed of steel or moulded in plastics material or any other suitable material displaying adequate strength characteristics.

Once the blocks 10 are positioned into the configuration of a wall, grout may be applied to the uppermost block so as to flow through respective bases 16 and fill the wall. The entire filling process can be visually monitored through walls 11 and 12.

Both horizontal and vertical reinforcing bars may extend throughout the width and height of the wall either passing through ends 17 and 18 for bases 16.

Although the blocks herein may be used in building construction, they are particularly intended for underground mining applications.

Where a wall is to be built to block off a section of a mine tunnel for example, the outermost blocks need not be accurately shaped to fit the adjoining strata face. For example, a section of appropriate angle may be removed from one end of the block, without paying particular attention to the overall length of the outermost block. That is, as the blocks may be telescoped within one another to a certain extent, the

RLF/04041

outermost block may be slide within the next block for the purpose of correctly mating with the adjoining strata face. To this end, the end most one or two base members 23 may be severed to allow lateral expansion of the end portion of each wall of one block so as allow the end of another block to fit therein.

Since almost the entire volume of the block is to be filled with grout, a substantial increase in face loading capacity is made possible.

Materials other than grout may be used in the blocks of the present invention. For example a perlite/cement mixture or a vermiculite/cement mixture or other suitable fire rated materials may be adopted.

Furthermore, wiring, plumbing and other services may readily be installed within a wall constructed with the blocks of the present invention.

In a preferred embodiment, the spacing between adjacent vertical members 13 is 125mm, and the spacing between adjacent horizontal member 14 is 124mm. The width of the block across the base might typically be 131.5mm. However, blocks of any size may be fabricated, depending upon application.

Modifications and alterations obvious to those skilled in the art are not to be considered as beyond the scope of the present invention. For example, the blocks herein may be provided with an upper face and end faces. Furthermore, although the description above refers to a frame formed of sheet wire, an alternative approach is to form the frame from plastics material. For example, the entire block, less the filling, may be fabricated as a single moulding. This moulding would include the "mesh".

RLF/04041

**The claims defining the invention are as follows:-**

1. A building block comprising:  
a base of mesh or sheet material, a pair of laterally spaced sides of mesh or sheet material, and open ends, the base and sides being adapted to aid in retaining infill material within the block, and  
an elongate cross brace connected to each side and extending laterally therebetween and being adapted to restrain the sides against outward movement as a result of load thereon from any infill material within the block.
2. The building block of claim 1 further including an open top.
3. The building block of claim 1 or claim 2 further comprising a frame comprising a grid of wire to at least a part of which said base and sides are attached.
4. The building block of claim 1 or claim 2 further comprising a frame comprising a grid of wire with at least a part of which said base and sides are intergrally formed.
5. The building block of claim 3 or claim 4 wherein the frame is formed of moulded plastics material.
6. The building block of claim 1 wherein the mesh or sheet is steel.
7. The building block of claim 1 wherein the mesh or sheet is a membrane of plastics or other material.
8. The building block of any one of the preceding claims wherein each side comprises both vertically and horizontally extending elements.
9. The building block of any one of the preceding claims wherein the cross brace has clip-engagement means for inter-engagement at each end thereof with said sides.
10. The building block of any one of the preceding claims being filled with an infill material.
11. A building block substantially as hereinbefore described with reference to the accompanying drawings.

**Dated 24 October, 1997**

**Tecrete Industries Pty Ltd**

**Patent Attorneys for the Applicant/Nominated Person**

**SPRUSON & FERGUSON**



IN REPLY TO 1148/KEH



60782 94 04 03

60782/94

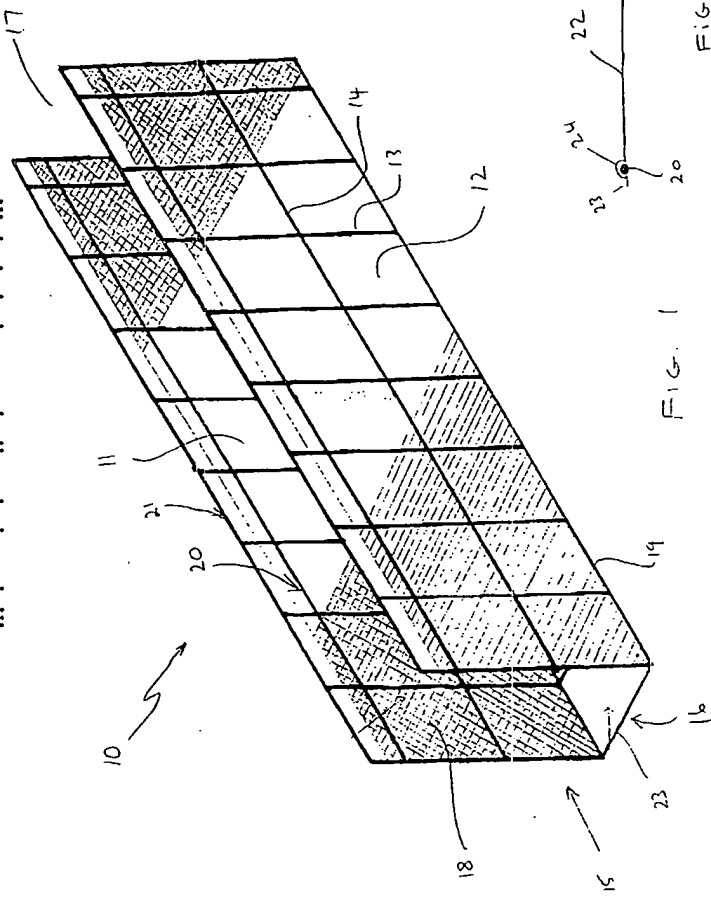


Fig. 1

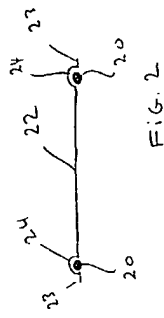


Fig. 2